

containing articles of value should be sent. No newspapers should be sent, as the Admiralty will send a sufficient supply.

THE University of Oxford is to confer upon Dr. Warren De la Rue the degree of M.A. by diploma.

THE ANNUAL Meeting of the Victoria Institute is postponed from the 22nd to the 29th of May.

LIEUT. CAMERON will, on Tuesday next, read to the Anthropological Society a paper on the Anthropology of Central Africa, in the theatre of the Royal School of Mines, Jermyn Street, at 8.30 P.M.

DOCENT THEEL, zoologist, a member of the Swedish Expedition of last year, to Novaya Zemlya, Docent Arnell, botanist, and Dr. Trybom, entomologist, have left Stockholm for Riga, whence they proceed overland to Siberia, where they will remain till autumn, making scientific observations and collections, and returning by the steamer *Ymer*, which Prof. Nordenskjöld has chartered for a voyage to the Yenisei.

M. JANSSEN, although he has not yet obtained possession of his regular observatory, has established large photographising telescopes at his residence at Montmartre. He found that during the cold period from the beginning of May up to the 10th, the sun had no spots at all. The photographs are about twenty centimetres in diameter.

C. M. STUART, of Harrow School, has been elected to the Natural Science Exhibition at St. John's College, Cambridge. A second exhibition was at the same time conferred on J. Nall, of Manchester Grammar School.

AT a recent meeting of the French Academy, M. Lecoq de Boisbaudran communicated some further facts regarding the new metal gallium. The specimen he had formerly presented owed its solidity to the presence of a small quantity of foreign bodies. Pure gallium, of which he had now prepared nearly ten centigrammes, melts at about $29^{\circ}.5$ C.; hence it liquefies when it is seized between the fingers. It is very easily held in superfusion, which explains how a globule has been kept liquid for weeks in temperatures descending occasionally almost to zero. Electrolysed gallium from ammoniacal solution is identical with that obtained from potassic solution. Once solidified, the metal is hard and resistant, even at a few degrees under its melting point; but it can be cut, and has a certain malleability. Melted gallium adheres easily to glass, on which it forms a beautiful mirror, whiter than that produced by mercury. Heated to a bright red in presence of air, gallium oxidises but very superficially, and does not volatilise; it is not sensibly attacked in the cold state by nitric acid, but in heat the solution operates with liberation of nitrous vapours. The density of the metal (determined approximately from a specimen weighing sixty-four milligrammes) is 4.7 at 15° , and relatively to water at 15° . The mean of the densities of aluminium and of indium is 4.8 at zero. Thus the density confirms theoretical prevision, while the extreme fusibility is a fact completely unexpected.

THE Marine tanks of the Royal Aquarium, Westminster, are being rapidly filled with water brought from Brighton by Messrs. Hudson, who supplied the Crystal Palace. For some time past many of the fresh-water tanks have been stocked, but the first marine fish has but quite recently arrived. It is a somewhat rare one in captivity—the *Motella tricerata* (Yarrell), commonly called the spotted leopard fish. It is placed in a central tank, so that the peculiarity of the “fin” in the neck can be well seen. Couch, in his “History of Fishes,” refers to this fin as being always in rapid action, but with this particular specimen it is often at rest. He points out that while its intimate structure shows that it is destitute of any power of propulsion or of regulating motion, it is well furnished with nerves which render it acutely sensible to impression. The functions of the fin have, so far as we know, not been determined.

MR. WALPOLE, on Tuesday, moved for leave to introduce “A Bill for making further provision respecting the University of Cambridge and the Colleges therein.” Following the recommendations of the Duke of Devonshire and the Oxford and Cambridge University Commissions, he indicated the nature of the changes desired as follows:—The extension of the professoriat, and a complete organisation of the system of inter-collegiate lectures and classes, for which provision would have to be made over and above that which had already been made, for museums, libraries, and the other apparatus which might be necessary for the prosecution of scientific investigation. The following are the names of the seven Commissioners it is proposed to appoint:—The Bishop of Worcester, Lord Rayleigh, the Lord Chief Justice, the Right Hon. E. P. Bouvier, Prof. Stokes, Rev. Prof. Lightfoot, and Mr. G. W. Hemmings. Mr. Cross said the Bill might be regarded for all practical purposes as a Government measure.

THE animals deposited in the Gardens of the Zoological Society by H.R.H. the Prince of Wales, include, among others, two Musk Deer (*Moschus moschiferus*); two Thar Goats (*Capra jemlatca*); four Indian Elephants (*Elephas indicus*), aged about 7, 6, $1\frac{1}{2}$ and $1\frac{1}{2}$ years; five Tigers, (*Felis tigris*); a Cheetah (*F. jubata*); a Viverrine Cat (*F. viverrina*); five Leopards (*F. pardus*); an Indian Civet Cat (*Viverricula indica*); two Dwarf Zebras (*Bos indicus*); seven Indian Antelopes (*Antelope cervicapra*); three Axis Deer (*Cervus axis*); three Ostriches (*Struthio camelus*); several pairs of Impeyan Pheasants (*Lophophorus impeyanus*); Cheer Pheasants (*Phasianus wallichii*); Horned Tragopans (*Cerionis satyra*); Chukar Partridges (*Caccabis chukar*). Besides the Prince's specimens, the following are the most important additions of the week:—Two Secretary Vultures (*Serpentarius reptilivorus*), presented by Mr. M. G. Angel; an Egyptian Cobra (*Naja haje*), presented by the Rev. G. H. R. Fisk; and a Maholi Galago (*Galago maholi*), presented by Dr. R. A. Zeederberg, all from S. Africa.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 4.—On the Modification of the Excitability of Motor Nerves produced by Injury, by G. J. Romanes, M.A., F.L.S.

It has long been known that when a nerve is cut, or otherwise injured, its excitability at or near the seat of injury undergoes a marked increase. No one, however, has attempted to determine the relative degree of this increase towards make and towards break of the current respectively. The author found that when the nerve-section rested on the *kathode*, the increase of excitability was manifested towards *make*, and scarcely at all towards *break*; while, conversely, when the section rested on the *anode*, such increase was manifested towards *break*, and scarcely at all towards *make*. These facts are of considerable interest in relation to the theory of electrotonus. The degree of the latter increase, however, is out of all proportion greater than that of the former; for while the ratio of excitability before and after cutting was represented by the numbers 36 : 46 in the case of the *kathodic* make, such ratio was represented by 2 : 32 in the case of the *anodic* break. Mr. Romanes explains this disproportion by the consideration, that as the sensitiveness to the *kathodic* make is so much greater than is that to the *anodic* break *before* nerve-section, after the general sensitiveness of the nerve has been increased by section, the increase has not so much room to assert itself in the former as it has in the latter case, before it reaches zero of the stimulating current's intensity. Thus the figures 2 : 32 :: 36 : 46, though not expressing any numerical proportion, may yet express a *real* proportion, if the zero of the current's intensity be represented say by 50 in the above scale of nervous excitability, and if it be granted that the value as a stimulus of any given increment of current is determined by the proportion which such increment bears to the intensity of current that is required to produce adequate stimulation. This explanation is confirmed by a method of graduating the galvanic stimulus other than that of graduating the intensity of the current, viz., by

graduating its duration. In this way it was found that, in respect of voltaic stimuli of very short duration, the sensitiveness to the cathodic make is much more increased by cutting than is that to the anodic break.

Mr. Romanes further observed that when a frog's gastrocnemius is subjected to a weak galvanic current, a part or parts of it will sometimes pulsate in a strictly rhythmical manner. This was proved to be a nervous effect by observing that it ceased when the attached sciatic was thrown into anelectrotonus.

With minimal stimulation of curarised muscle, the author found that considerably more effect is produced by first laying on the anode and then the kathode, than is produced if this order is inverted. This fact is just the converse of what Hitzig found to be true of cerebral stimulation, and as such it may be taken as confirmatory of his views concerning the reversed relations that subsist between central and peripheral voltaic excitation.

May 11.—"On some Thallophtes parasitic within recent Madreporaria." By P. M. Duncan, M.B. F.R.S., President of the Geological Society.

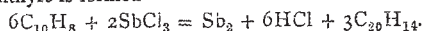
"Condensation of Vapour of Mercury on Selenium in the Sprengel Vacuum." By R. J. Moss, F.C.S., Chemical Laboratory, Royal Dublin Society. Communicated by G. Johnstone Stoney, F.R.S.

Royal Microscopical Society, May 3.—Mr. H. C. Sorby, F.R.S., president, in the chair.—Mr. Chas. Brooke, F.R.S., proposed a special vote of thanks to the president for the conversation given by him on the 21st inst.—A paper was read by Mr. Blake on the occurrence of what appeared to be Foraminifera in the coralline oolite, and specimens in illustration were exhibited under microscopes in the room.—Mr. J. Glaisher communicated a paper by Dr. Gayer, describing the apparatus employed and the process adopted by him in India for the purpose of taking photo-micrographs with high powers.—A paper by Dr. J. J. Woodward on the markings of the body-scale of the English guat and the American mosquito was read by the Secretary.—Some notes upon the same subject by Dr. Anthony were also communicated.—A short paper by Mr. Stodder on the identity of *Frustulia saxonica*, *Navicula rhomboides*, and *N. crassirostris* was read by the Secretary.—Mr. Chas. Stewart called attention to a curious living organism exhibited by Mr. Budecek, and which the Fellows present were requested to examine with a view to its identification.

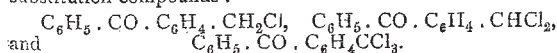
Victoria (Philosophical) Institute, May 8.—After the election of new members, of whom fifty were announced as having been admitted during the past four months, it was stated that Prof. Birks would deliver the Annual Address for 1876.—A paper on the metaphysics of Scripture was then read by Prof. Challis, F.R.S.

BERLIN

German Chemical Society, March 27.—A. W. Hofmann, president, in the chair.—A. Flücker has proved the presence of *carvacrol* in the oils of *mentha viridis* and of *anethum graveolens* by producing its characteristic combination with sulphuretted hydrogen.—O. Fischer described nitroso-acetanilide, $\text{NC}_6\text{H}_5 \cdot \text{C}_2\text{H}_3\text{O} \cdot \text{NO}$, an unstable compound from which acetanilide is easily reproduced.—J. Dümmer, by the action of amidophenol, $\text{C}_6\text{H}_4\text{OHNH}_2$, on sulphuret of carbon, has obtained an oxysulphocyanide of phenyl, $\text{C}_6\text{H}_5\text{NSO}$.—W. Smith has observed, that by passing through a red-hot tube naphthalene-vapour together with terchloride of antimony or tetrachloride of tin, a good yield of dinaphthyl is formed—



W. Thöerner has studied the action of hydrogen and of chlorine on tolylphenyl ketone. The latter gives rise to three crystallised substitution compounds:—

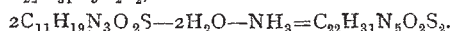


The latter with water yields the acid $\text{C}_6\text{H}_5 \cdot \text{CO} \cdot \text{C}_6\text{H}_4\text{COOH}$. With zinc and hydrochloric acid the ketone yields a pinacolone, $\text{C}_6\text{H}_5 \cdot \text{C}(\text{C}_6\text{H}_4\text{CH}_3)_2$, as well as an isomeride.—H. Eimprich described a number of substitution-compounds of meta-amido-benzosulphuric acid with bromine.—C. Counciler has obtained borate of allyl, $\text{Bo}(\text{OC}_2\text{H}_5)_3$, a liquid boiling at 170° , by the action of boric anhydride on allylic alcohol.—Lothar Meyer, after decomposing sulphate of copper by metallic zinc, found in solution nothing but neutral sulphate of zinc,

while metallic copper and basic sulphate of zinc were deposited on the metal. Evolution of hydrogen gas takes place during this process.

April 10.—H. Eimprich described new derivatives of sulpho-benzolic acid.—H. W. Vogel reported on the spectroscopic reactions of blood.—Robert Schiff described the action of isosulphocyanide of phenyl with aldehyde-ammonia. The body expected $\text{C}=\text{S}-\text{NHC}_6\text{H}_5-\text{NH} \cdot \text{CH} \cdot \text{OH}$, or $\text{C}_{11}\text{H}_{19}\text{N}_3\text{O}_2\text{S}$

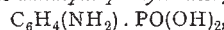
loses water and ammonia, and yields a well crystallised substance, $\text{C}_{22}\text{H}_{31}\text{N}_5\text{O}_2\text{S}_2$, thus:—



The new body with acetic anhydride yields a phenylated and acetylated sulpho-urea: $\text{C}=\text{S}-\text{NH} \cdot \text{C}_6\text{H}_5-\text{NH} \cdot \text{C}_2\text{H}_3\text{O}$.—G. Schultz has treated isodinitrodiphenyl with tin and hydrochloric acid, thus transforming it into an isomeride of bezidine, called by the author diphenylene, $\text{C}_{12}\text{H}_8(\text{NH}_2)_2$, crystallising in colourless scales, and fusing at 53° .—W. Staedel and L. Rügheimer have studied the action of alcoholic ammonia on chloro-acetyl-benzol $\text{C}_6\text{H}_5-\text{CO}-\text{CH}_2\text{Cl}$. The results are two bodies. One insoluble in ether, but soluble in boiling alcohol, from which it crystallises in silky needles, fusing at 194° , proved to be isomeric with indol, having the formula $\text{C}_6\text{H}_5-\text{C}=\text{CH}_2$.



—The other substance soluble in ether appears to correspond to the formula $\text{C}_6\text{H}_5-\text{CO}-\text{CH}_2\text{NH}_2$.—E. Demole, studying the action of bromine on chlorhydrine of glycol, has found the following products of reaction: bromide of ethylene, bromochloride of ethylene, bromhydrine of glycol and bromo-acetic ether.—F. Beilstein and A. Kurbatoff have prepared two tetrachlorobenzols in which the four atoms of chlorine are situated at 1. 2. 3. 5 and 2. 3. 5. 6 respectively; by starting from corresponding trichloranilines. The latter when oxydised yields chloranil, from which the authors conclude that in chinone the two atoms of oxygen occupy the positions 1: 4.—E. Ullrich and H. von Perger described the differences between iso-anthraflavinic and anthroxanthinic acids.—F. Kessler described spectral apparatus for lecture purposes, the novelty of which consists in retransmitting the spectrum through the prism that engendered it, so as to obtain a dispersion of double magnitude.—H. Tollens described a shortened method of obtaining levulinic acid, $\text{C}_5\text{H}_8\text{O}_2$, from fruit sugar.—V. Meyer and F. Forster have repeated M. Einnemann's experience of decomposing normal propylamine with nitrous acid, and they arrive at the result that not only isopropyl alcohol but also normal propyl alcohol and propylene are thus engendered. The latter, combining with water, yields the isopropyl alcohol, the formation of which was hitherto unexplained.—O. Wallach and Th. Heymer have succeeded in combining directly chloral and trichlorolactic acid, thus forming chloralid, and proving that chloralid is the ether of trichlorethylidene with trichlorolactic acid. Lactic acid also combines with chloral.—A. Michaelis and E. Benzinger have reduced nitro-phosphenylic acid to amidophosphenylic acid,



white brilliant needles soluble in water. With soda-lime they yield aniline and phosphates. Nitrous acid transforms it into nitrate of diazophosphenylic acid: $\text{PO}_3\text{H}_2 \cdot \text{C}_6\text{H}_3\text{N} = \text{N} \cdot \text{NO}_3$. Phosphenylic acid and soda-lime yields benzol, while nitro-phosphenylic acid and soda lime yields nitro-benzol. The same chemists have produced phosphenyl-bromide, $\text{C}_6\text{H}_5\text{PBr}_2$, a colourless liquid, by passing hydrobromic acid gas into the corresponding chloride. With bromine it forms two solids of the formula $\text{C}_6\text{H}_5\text{PBr}_4$ and $\text{C}_6\text{H}_5\text{PBr}_6$ respectively.—H. Lecco has obtained from sodium-nitromethane, CH_3NaNO_2 , an anhydride, $\text{C}_2\text{H}_3\text{N}_2\text{O}_3$.—W. Michler, from an acid lately described dimethylamidobenzoic acid, $\text{C}_6\text{H}_4 \cdot \text{N}(\text{CH}_3)_2 \cdot \text{COOH}$, has obtained a basic ketone,



A third rest, $\text{C}_6\text{H}_4\text{N}(\text{CH}_3)_2$ —can replace an atom of hydrogen in this ketone, thus producing a complicated non-basic ketone.—H. Zincke has obtained, by the action of H on β benzoyl-benzoic

acid, an anhydride, $\text{C}_6\text{H}_5\text{CH}=\text{C}_6\text{H}_4$; and from it, by chloride

of phosphorus, anthrachinone.—C. Liebermann and H. Palm described β bromonaphthalene, $\text{C}_{10}\text{H}_7\text{Br}$, obtained from β naph-

thylamine by passing through the corresponding diazo-compound and naphthol.—A. Frank showed zeolith-like crystallisations in slowly-cooled glass. The same chemist showed wrought-iron transformed into silicium-iron by immersion in molten glass.—

C. Bücking has transformed anisic aldehyde, $C_6H_5 \begin{smallmatrix} OCH_3 \\ COH \end{smallmatrix}$ into paraoxybenzoic aldehyde, $C_6H_5 \begin{smallmatrix} OH \\ COH \end{smallmatrix}$, fusing at 111° .

April 24.—N. Gerber described an apparatus for closing the fat contained in milk.—P. J. Anster has transformed solid dibromobenzenes into three isomeric dinitro-dibromobenzenes; one of which he transformed into nitro-dibromo-aniline.—R. Ebert and V. Marz described two isomeric disulphonaphthalic acids, $C_{10}H_6(SO_3H)_2$, formed simultaneously and separated by the unequal solubility of their chlorides in benzol. With cyanide of potassium two bicyanides and the corresponding dinaphthoic acids were obtained; while fusion with potash transforms one of the sulpho-compounds into $C_{10}H_6(SO_3H)OH$, which with water yields β -naphthol; while the other sulpho compound yields dioxynaphthaline with a melting-point 186° .—F. Worend discussed the constitution-formula of naphthaline.—F. Priwoznik finds the crystals formed in Leclanché's battery to correspond to the formula $ZnCl_2(NH_3)_2$.—H. Vogel defended the spectroscopic analysis of blood, sustaining that the spectroscopic reaction of indigo cannot be confounded with that of blood.—A. Oppenheim and H. Emmerling have continued their researches on the oxidation of oxyvinic acid. Nitric acid yields hydro-oxybenzoic acid, while a mixture of sulphuric with fuming nitric acid produces trinitrocresol apparently identical with that obtained by Liebermann from nitro-coccinic acid.—P. Griess has formed combinations of phenol with one molecule and with two molecules of diazobenzol.

VIENNA

Geological Society, Jan. 18.—The director, M. v. Hauer, presented a paper by M. F. Seeland, intended for the *Jahrbuch*, on the Erzberg, near Hüttenberg, in Carinthia, in which the author gives a detailed description of the geological relations of these mines, so very important to the iron industry in the Alpine districts. A map on the scale of 1:8640, and some sections, show the structure and distribution of the rocks, of which the following are specified:—Gneiss, mica-schist, Tourmaline rock, crystalline limestone, mica-schist containing garnets, amphibolite, argillaceous mica-schist, eclogite, besides the beds containing the ores.—M. E. Döll showed some minerals from Waldenstein, in Carinthia, among them a Pyrrhotite metamorphosed into ochreous red iron ore, which had not been noticed before; pure antimony, &c.—Dr. Neumayer, on the geological structure of the peninsula Oenalkidike, on the coast of Macedonia. By far the largest area of the whole country is covered with crystalline schists of the most varied lithological composition. In these strata are imbedded in some parts considerable masses of crystalline marble; for instance, on Mount Athos. The whole complex of schists and marbles forms a geological unity. Of a more ancient date there is only a small-grained gneiss, composing the peninsula of Zongo.—Dr. R. Hörnes, a paper contributing to the knowledge of the Megalodontes from the Alps.

PARIS

Academy of Sciences, May 8.—Vice-Admiral Paris in the chair.—The President announced the presence of the International Committee of Weights and Measures, meeting in Paris for the first time since the various States represented had given legal sanction to the convention prepared by the diplomatic conference. The following papers were read:—On osmium, by MM. Sainte-Claire-Deville and Debray.—Note on fermentation, *à propos* of criticisms by Drs. Brefeld and Traube, by M. Pasteur. In a recent brochure Dr. Brefeld retracts his assertion that life cannot exist in an atmosphere deprived of oxygen. Examples, *Mucor racemosus* and beer yeast.—Note on electric transmissions without conducting wires *à propos* of recent papers by MM. Bouchotte and Bourbouze, by M. Th. Du Moncel. He recounts experiments he made some thirty years ago, and the theoretical deductions drawn.—On a calcareous alabaster from Mexico, by M. Damour. This new import, known as *onyx de Tecali*, is made into various ornaments, stands, pendulum supports, &c. It has undulating layers of various hues, and takes a fine polish.—On the flooding of the Seine, and the means of preserving Paris from the overflow of the river, by M. Belgrand. With quays insubmersible by floods of a given height Paris might be preserved (1) from overflows of these floods, by prolonging the collecting sewers from the quays to the fortifications, isolating them completely from the river, and keeping

them at their normal level by engines at the Clichy works; (2) from subterranean inundations, by means of a drainage lower than the submerged caves, and without communication with the river and the sewers, and maintaining the ordinary level with centrifugal pumps and turbines worked by the water of the city.—M. Colladon was elected correspondent for the section of mechanics, in place of the late M. Seguin.—New solution of the general equation of the fourth degree, by M. Weichold.—New system of marine maps for navigation, by arcs of great circle, by M. Hilleret.—Extraction of gallium from its ores, by M. Lecoq de Boisbaudran.—Action of zinc on solutions of cobalt, by M. Lecoq de Boisbaudran. He has sometimes met with considerable quantities of cobalt in the metallic sponge resulting from action of zinc on the solution of blende in aqua regia. He notes the conditions of this singularity.—Influence of carbonic acid on the respiration of animals, by M. Raoult. Slow chemical actions are generally limited by the presence of the products formed; if the latter are not liberated the reactions remain incomplete. M. Raoult verified by experiment on rabbits, that the presence of carbonic acid in inspired air diminishes the quantity of carbonic acid produced, and especially that of the oxygen consumed in an hour; in other terms, the presence of carbonic acid in inspired air is an obstacle to hæmatosis.—On acetyl-persulphocyanic acid, by M. de Clermont.—On the exchanges of ammonia between the atmosphere and mould, by M. Schloesing. These preliminary experiments show distinctly that, in general, mould borrows ammonia from the atmosphere. The supposed exhalation of ammonia during drought is, in all probability, an error; it is the contrary that occurs.—On the oscillation of the half of November, observed at Nijni Novgorod, by M. Bobynine.—On the existence of mercury in the mineral state in the department of l'Herault, by M. Thomas. He has found it flow abundantly from the débris of a mountain called Bois de Cazilhac, in the canton of Ganges, also elsewhere. A particular lichen is found in those parts.—On the properties of the oysters called Portuguese, by M. Champouillon. These are from the Bay of Lisbon and mouth of the Tagus, where they have great fecundity, occupying an extent of about 50 kilometres. They have a claw-like shell, with small characteristic black point inside and a dark fringe. Analysis of the extracted oyster shows it to contain much more bromine and iodine than oysters on the English coast (0.039 gr. iodine and 0.052 gr. bromine in 1 kilogramme of the animal substance, which contains, besides, 760 grammes of water, and a slightly violet colouring matter). It is a valuable food, and is theoretically well suited for prevention of scrofula, ganglionic swellings, rickets, and perhaps also phthisis. This oyster cannot thrive on the coasts of Normandy, Belgium, or Britain.—Action of hydriodic acid on quercite, by M. Prunier.—Analysis of native magnetic platinum of Nischne Tagilsk (Oural), by M. Terreil. The considerable proportion of nickel in the ore is interesting.—Anatomy of the heart of Crustaceans, by M. Dogiel. (This forms part of a series of researches designed to throw light on the cause of rhythmic contractions of the heart in vertebrates.) The ligaments of the heart in these animals do not play the direct physiological rôle that has been attributed to them; and the membrane which separates the heart from the liver, the digestive apparatus, and the genital organs of a lobster, is much more complicated and important than has hitherto been supposed, both as to structure and its rôle in the movement of the heart.

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